Clean Energy and Clean Transportation in NC: A Workforce Assessment

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Clean Energy & Clean Transportation in NC:

A Workforce Assessment

Background

- On October 29th, 2018, Governor Roy Cooper signed Executive Order 80, entitled "North Carolina's Commitment to Address Climate Change and Transition to a Clean Energy Economy."

- NC Commerce asked to assess current & future workforce in North Carolina's clean energy and clean transportation sectors

- Assess the skills & education required for employment in these sectors

- Recommend actions to help North Carolinians develop these skills & education

Background

- Team included
  - George Sherrill, NC Commerce Chief of Staff
  - John Hardin, Executive Director of Office of Science and Technology & Innovation
  - Researchers with Labor and Economic Analysis Division (LEAD)

- Consulted with a variety of stakeholders, including
  - Other states and national researchers
  - Industry associations
  - Education, Labor, and other stakeholders

- Literature Review and analysis of LEAD data

Initial Challenges

- Challenges of defining and counting “clean” employment
  - Which industries are clean?
  - What proportion of workers or workers’ time?
  - Data classification issues—North American Industrial Classification System (NAICS)
- Previous efforts include BLS’ Green Goods Survey, NC’s Green Economy
- Other national and state level reports
  - US Energy Employment Report (USEER)
  - Clean Jobs Counts
  - Brookings Institution
  - NC Sustainable Energy Association

Industry Definition

- Based on stakeholder input, literature review & existing data sources, analyzed three broad groups of 6-digit NAICS industries:
  - **Clean Energy Generation+ (18 industries)**
    - Power Generation (solar, wind, etc.), Transmission & Distribution, Storage & related Manufacturing, etc.
  - **Energy Efficiency (37 industries)**
    - Construction, Remodeling, Contracting & Manufacturing of efficient products & related Services, etc.
  - **Clean Transportation (33 industries)**
    - Motor Vehicle Parts Manufacturing, Trucking, Rail, Buses & other transportation, etc.

Industry Detail

CLEAN ENERGY GENERATION+ INDUSTRIES

Grouped to avoid data suppression

	2018 Jobs	5-Year Growth Rate
Utility Construction and Electrical Contractors	41,589	28.3%
Power Generation and Supply	8,260	84.9%
Other Electrical Equipment & Component Manufacturing	4,338	-6.0%
Power Boiler, Heat Exchanger, Turbine & Turbine Generator Set Units Manufacturing	2,244	-10.9%
Power, Distribution, & Specialty Transformer Manufacturing	640	6.3%
***CLEAN ENERGY GENERATION+* TOTAL**	**57,071**	**27.9%**

ENERGY EFFICIENCY INDUSTRIES

Grouped to avoid data suppression

	2018 Jobs	5-Year Growth Rate
Building Construction & Land Subdivision	49,083	31.3%
Plumbing & HVAC Contractors	39,779	32.2%
Electronic Instrument & Semiconductor Manufacturing	12,587	13.8%
Carpentry & Other Specialty Contractors	10,924	10.5%
Architectural, Landscape, Drafting & Building Inspection Services	6,395	10.2%
HVAC & Commercial Refrigeration Equipment Manufacturing	5,877	8.5%
Roofing Contractors	5,328	9.4%
Nonmetallic Mineral Product and Architectural & Structural Metals Manufacturing	4,335	22.6%
Household Appliance, Miscellaneous Electrical Equipment & Component Manufacturing	3,497	233.6%
Motor & Generator Manufacturing	3,038	9.1%
Electric Lighting Equipment Manufacturing	900	-7.2%
***ENERGY EFFICIENCY* TOTAL**	**141,744**	**25.6%**

Industry Detail

CLEAN TRANSPORTATION INDUSTRIES

Grouped to avoid data suppression

	2018 Jobs	5-Year Growth Rate
Truck Transportation	43,075	15.7%
Transportation Equipment Manufacturing	27,310	21.3%
Couriers and Messengers	18,741	31.2%
Transit and Ground Passenger Transportation	8,480	14.2%
Support Activities for Rail Transportation	346	25.9%
***CLEAN TRANSPORTATION* TOTAL**	**97,951**	**19.9%**

Occupations

- Based on staffing patterns, we focused on the occupations that comprised at least 1% of workers in each industry (2/3 of all employment)
  - **Clean Energy Generation+ (21 occupations)**
    - Electricians, Power-Line Installers, Construction Laborers, Operating Engineers, Team Assemblers, etc.
  - **Energy Efficiency (20 occupations)**
    - Supervisors of Construction, HVAC Mechanics & Installers, Plumbers, Carpenters, Team Assemblers, etc.
  - **Clean Transportation (15 occupations)**
    - Tractor-Trailer Truck Drivers, Light Truck or Delivery Drivers, Bus & Truck Mechanics, Bus Drivers, etc.

CLEAN ENERGY GENERATION+ OCCUPATIONS

Occupation	2018 Jobs in Group	% of Total Jobs in Group
Electricians	12,385	21.7%
Helpers—Electricians	4,839	8.5%
Electrical Power-Line Installers & Repairers	3,519	6.2%
First-Line Supervisors of Construction Trades & Extraction Workers	3,266	5.7%
Construction Laborers	2,086	3.7%
Construction Managers	1,386	2.4%
Office Clerks, General	1,281	2.2%
Operating Engineers & Other Construction Equipment Operators	1,229	2.2%
Telecommunications Line Installers and Repairers	1,185	2.1%
First-Line Supervisors of Mechanics, Installers, & Repairers	1,122	2.0%
General & Operations Managers	960	1.7%
Telecommunications Equipment Installers & Repairers, Except Line Installers	880	1.5%

Worker Characteristics

- Number of existing workers in each occupation
- Demographic characteristics of workers (e.g., age, gender, race, educational attainment)
- Average wages
- Minimum educational requirement
- Projected growth from 2017 to 2026
- Ranking in NC Commerce 5-Star ranking system (based on job growth rate, openings & wages)

Demographic Characteristics

- Workers in the 41 occupations more frequently men (67% vs. 51% for NC)
- Lower levels of educational attainment (16% with BA or higher vs. 34% for NC)
- Similar in age and race of workforce, although with higher percentage of Hispanic workers (11% vs. 9% for NC)
- Demographic characteristics vary widely by occupation
  - Construction occupations are more male-dominated, have more Hispanic workers, and lower levels of educational attainment
  - Office and Administrative occupations tend to be female-dominated, whiter, and older
  - As Brookings report points out, there are opportunities in many occupations to grow percentages of women, minorities, and younger workers

Wages

- Cover a wide range, from $28,880 for freight laborers to $108,750 for general and operations managers (median annual wages)
- Of the 41 occupations in the three industry groups, 25 (61%) have median wages higher than the state median ($35,750)
- 16 (39%) of the occupations have lower median annual wages

Educational Requirements

- Minimum education typically required for entry according to the Bureau of Labor Statistics
- 28 occupations (68%) require a high school diploma or equivalent
- 4 occupations have no formal education credential for entry
- 4 occupations require some postsecondary education
- 5 occupations require a Bachelor's degree for entry
- Important to remember these are education levels that workers typically need to enter an occupation; may not match qualifications demanded by employers in job postings

Projected Growth

TOP 10 CLEAN ENERGY GEN+, EFFICIENCY, & TRANSPORTATION PROJECTED GROWTH OCCUPATIONS

Occupation	% Change	Job Change
Solar Photovoltaic Installers	42.9%	260
Bus Drivers, Transit & Intercity	15.0%	572
Electrical Power-Line Installers & Repairers	14.5%	678
Security & Fire Alarm Systems Installers	14.3%	393
Helpers--Pipelayers, Plumbers, Pipefitters, & Steamfitters	14.0%	415
First-Line Supervisors of Construction Trades & Extraction Workers	12.4%	3,258
Plumbers, Pipefitters, & Steamfitters	12.4%	1,540
Construction Managers	11.8%	1,879
Heating, Air Conditioning, & Refrigeration Mechanics & Installers	11.5%	1,746
Electrical Engineers	11.2%	627

5-Star Jobs

5-STAR JOBS IN CLEAN ENERGY GEN+, EFFICIENCY, & TRANSPORTATION PROJECTED GROWTH OCCUPATIONS

Occupation	2017-2026 Growth Rate	2017-2026 Total Openings	2018 Median Wage
Construction Managers	11.8%	12,123	$97,290
Cost Estimators	10.0%	7,143	$59,750
Electrical Engineers	11.2%	3,969	$91,680
Electrical Power-Line Installers & Repairers	14.5%	4,178	$59,690
First-Line Supervisors of Construction Trades & Extraction Workers	12.4%	27,095	$59,040
First-Line Supervisors of Mechanics, Installers, & Repairers	8.9%	14,590	$63,620
General and Operations Managers	10.6%	46,843	$108,750

Assessing the Supply of Workers

- What are the key workforce training, education & apprenticeship programs that contribute workers to these industries?
- How many individuals have completed these programs in recent years?
- What are the employment and wage outcomes for individuals completing those programs?
- What programs did current workers in these industries participate in?

Labor Supply Data Sources

- Industry employment from Quarterly Census of Employment and Wages (QCEW)
- Occupational employment from Occupational Employment Statistics (OES)
- Academic Awards from Integrated Postsecondary Education Data System (IPEDS)
- Common Follow-up System (CFS), a longitudinal data system that contains a repository of workforce and education data and is a joint effort among several of the North Carolina's education and workforce development agencies

Labor Supply (IPEDS)

- Based on the 41 occupations, we identified nearly 170 program codes (CIPs)
- In 2016-17, NC's public and private postsecondary institutions reported over 29,000 completions
  - 14,000 in Business-related program areas
  - Mechanic and Repair Technologies/Technicians (3,198 completions)
  - Engineering Technologies/Technicians (2,962 completions)
  - Engineering (2,824 completions)
  - Precision Production (2,295 completions)
  - Construction Trades (1,595 completions)
  - Transportation and Materials Moving (1,016 completions)
- Most common degree types were BA (33%), awards of less than 2 years (33%), MA (17%) and Associate degrees (13%)

Labor Supply (CFS)

- 18,600 individuals received an academic credential in 2017-18 from UNC System or NC Community Colleges system in identified CIPs
  - 52% received credential through NCCCS
  - 35% received undergraduate degree from UNC System
  - 13% received graduate level degrees from UNC System
- Looked back at previous cohorts of graduates in the CIPS beginning with 09-10 to assess employment and wage trajectories
  - 75% employed in NC after 1 year, with varying levels of decline over time
  - Wages tend to increase over time, from low $20Ks to high $30Ks after 5 years for NCCCS
- Important to remember continuing education and customized training are not included in these data but are important contributors to these occupations

Current Workers in Clean Economy

- Over 440,000 unique wage earners in the identified industries in 2018
- Of these individuals:
  - 59% participated in at least one education, training or workforce development program during the ten years prior (2008-2017)
  - 34% participated in education or training program through the NCCCS
  - 14% in NCCCS Continuing Education and Customized Training
  - 10% in NCCCS curriculum programs
  - 6% participated in UNC System

Labor Supply—Apprenticeships

- NCCCS administers North Carolina's registered apprenticeship program through ApprenticeshipNC
- 4,500 active apprentices (54% of total) in clean economy-related occupations in 2019, including
  - 1,040 Electrical Power-Line Installers and Repairers
  - 967 Electricians
  - 688 Telecommunications Equipment Installers and Repairers
  - 248 Telecommunications Line Installers and Repairers
  - 212 Pipe Fitters and Steamfitters
  - 180 Heavy and Tractor-Trailer Truck Drivers
- Additional apprenticeships through Union Apprenticeship programs, such as the International Brotherhood of Electrical Workers' (IBEW) Joint Apprenticeship and Training Committee (JATC)

Assessing the Demand for Workers

- Online postings aggregators such as Conference Board's *Help Wanted OnLine (HWOL)* adjusted using estimates from BLS' JOLTS survey
- Calculated ratio of monthly postings for an occupation to the total employment (in 2017) for that occupation
    - May reveal high level of "churn" in an occupation or difficulty attracting new entrants

OCCUPATIONS IN HIGH DEMAND

Occupation	Monthly Postings/ 2017 Employment
First-Line Supervisors of Production & Operating Workers	15%
Heavy and Tractor-Trailer Truck Drivers	10%
Light Truck or Delivery Services Drivers	8%
Customer Service Representatives	7%
Bus & Truck Mechanics & Diesel Engine Specialists	6%
Sales Representatives, Services, All Other	6%
First-Line Supervisors of Construction Trades & Extraction Workers	5%
Sheet Metal Workers	5%
Telecommunications Equipment Installers & Repairers	5%
First-Line Supervisors of Mechanics, Installers, & Repairers	5%
Roofers	5%
Electrical Engineers	5%

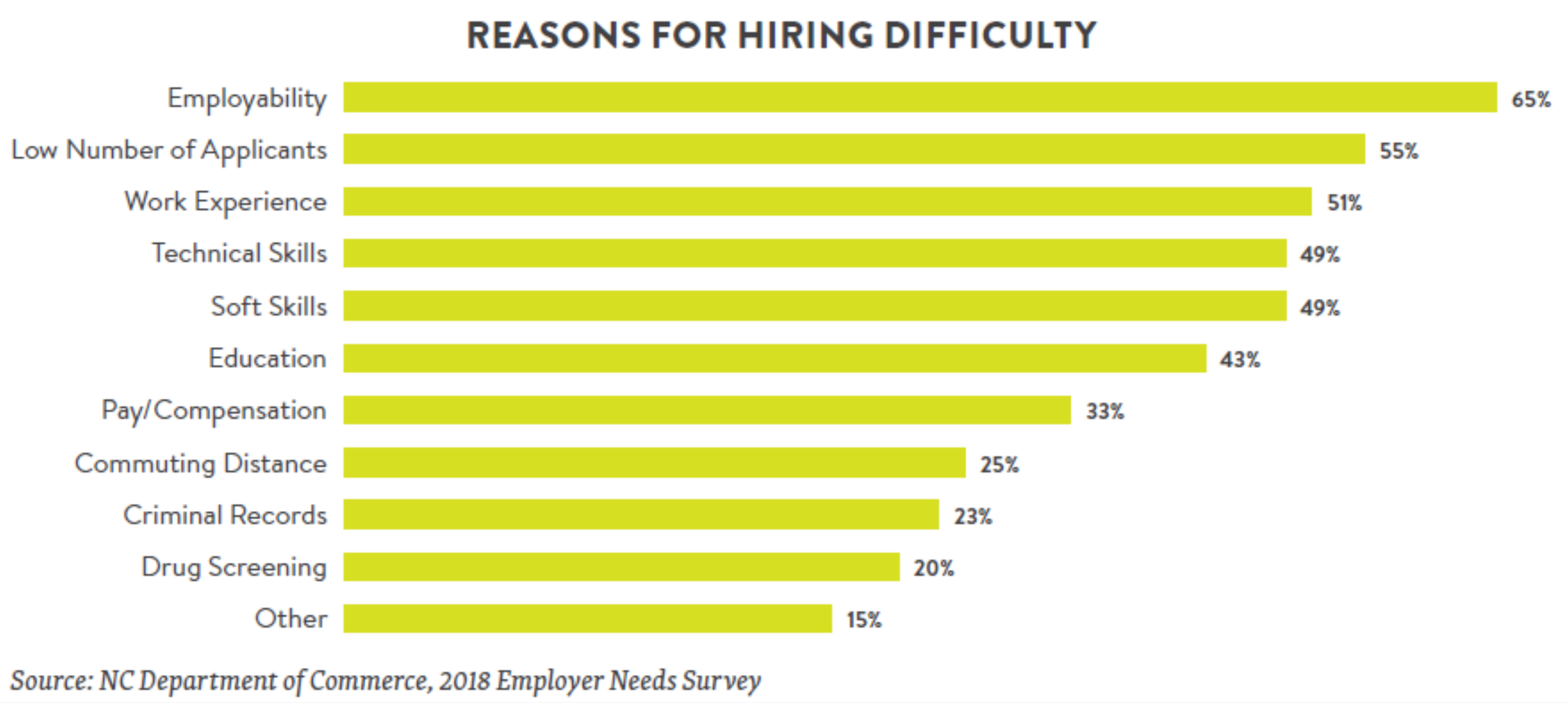
Assessing the Demand for Workers

- Can also look at increase in postings over past 5 years
  - Production Supervisors (147%)
  - Heavy Truck Drivers (98%)
  - Light Truck Drivers (188%)
  - Bus and Truck Mechanics (128%)
  - Construction Supervisors (163%)
  - Supervisors of Mechanics (95%)
- These occupations are in **high** and **growing** demand

Assessing the Demand—industry feedback

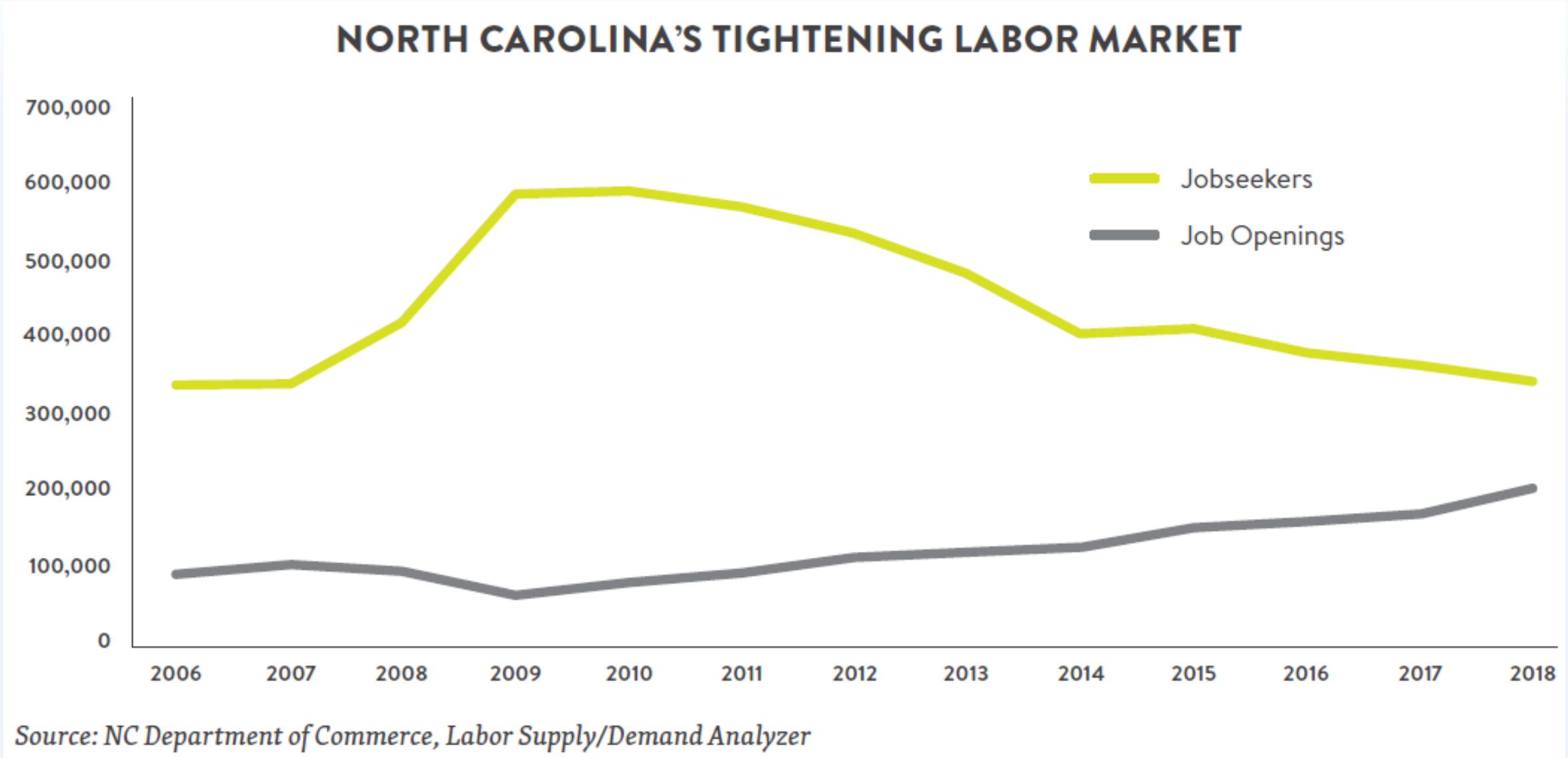
- Strong hiring demand in construction, skilled trades, and technical fields such as engineering
- Stressed both technical skills as well as soft skills or general employability
  - Including applicants' drug use or criminal records as barriers to hiring
- Due to an aging workforce, there was a strong need to hire younger workers
- Employers perceived a lack of interest by younger workers in these particular occupations or industries

Employer Needs Survey (2018)



Source: NC Department of Commerce, 2018 Employer Needs Survey

The Big Picture



Source: NC Department of Commerce, Labor Supply/Demand Analyzer

Key Findings

NC has a large clean economy workforce in a range of industries & occupations

- Nearly 300,000 workers currently work in clean economy industries
- While not all the industries are 100% “clean,” they employ the workforce needed to transition to a clean economy
- The industries employ workers in a wide range of occupations, with jobs available at all education, skill & wage levels

Key Findings

NC is meeting current clean economy workforce needs overall—in large part because of its strong workforce & education systems

- High School CTE programs, Community College & University programs, and apprenticeship programs all contribute workers
- 1 out of 3 workers currently working in the clean economy has participated in a Community College education or training program
- Over 29,000 credentials were granted at all post-secondary institutions in the state in relevant curricular programs

Key Findings

NC has opportunities to prepare its workforce for growth of the clean economy

- Increased employer engagement with workforce & education partners will be vital to meeting future needs
- Workforce & education providers should increase awareness of job opportunities for youth to develop the pipeline of future workers
- Department of Commerce's business & workforce development programs should be utilized to support the clean economy
- NC should specialize in strategic sectors of the clean economy (e.g., clean transportation manufacturing, solar, offshore wind)

Innovative Examples and Assets

- Carolinas Energy Workforce Consortium (CEWC) Lineworker programs
- Central Piedmont Community College Tesla START Program
- UNC System Clean Energy Research Centers at NC A&T, Appalachian State, and NCSU

Questions?

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